Assessment of routine elimination of postoperative nasogastric decompression after Roux-en-Y gastric bypass

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Background. *Anastomotic disruption after surgical intervention is an infrequent complication, but may lead to severe morbidity and mortality when it occurs. Of the various gastric procedures, the Roux-en-Y gastric bypass (RYGB) has one of the highest risks for anastomotic leakage. Consequently, a nasogastric tube (NGT) is frequently placed when these operations are performed. Most studies examining the outcomes for patients without postoperative NGTs have been relatively small with groups of patients undergoing a variety of operations. Assessing the incidence of anastomotic leaks by routine elimination of postoperative NGTs requires a large number of patients. In this study, we assessed the safety and efficacy of routine elimination of NGTs in a large cohort of patients undergoing a single operation.*
Methods. *We reviewed our experience with 1067 patients who underwent RYGB at the UCLA medical center. Fifty-six patients had NGTs routinely placed before the implementation of a standard protocol, which eliminated postoperative NGT decompression. The complication rate for the RYGB patient cohort with and without postoperative NGT was compared.*
Results. *We found no difference in the complication rates between the 2 groups (Fisher exact test;* $P = .21$*).*
Conclusions. *Our findings suggest that routine placement of an NGT after RYGB is unnecessary. (Surgery 2002;132:844-8.)*

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THE RAPID INCREASE IN OBESITY in the US population has resulted in a parallel increase in the number of bariatric operations performed in the United States. The Roux-en-Y gastric bypass (RYGB) has become the gold-standard operation for the treatment of morbid obesity.[1,2] The technical complexity of the operation coupled with placement of 2 proximal gastrointestinal anastomoses is associated with the potential for anastomotic leakage. Patients with obesity do not tolerate complications well and because nasogastric intubation theoretically reduces the incidence of gastrointestinal complications in abdominal operations,[3] a nasogastric tube (NGT) is often routinely placed after RYGB. However, NGTs cause pain[4] culminating in reduced respiratory function, which may result in atelectasis and pneumonia.[3,5]

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Use of NGTs dates back to the original report from Wangensteen[6] demonstrating the benefit of nasogastric decompression for the treatment of small bowel obstruction. As a result, nasogastric intubation drastically reduced mortality from bowel obstruction and was one of the most important advances in surgical care in the early 20th century.[7] The results observed after nasogastric intubation for the treatment of bowel obstruction were so dramatic that NGTs were placed for most clinical conditions where gastrointestinal obstruction was a prominent feature. Because laparotomy was commonly associated with prolonged ileus, routine placement of NGTs for every operation involving opening the abdomen became standard practice.

As early as the 1960s, reports of clinical series suggested that nasogastric intubation was more harmful than beneficial for some operations.[4,8,9] Outcomes for routine postoperative nasogastric intubation have been studied for several operations. These studies have uniformly demonstrated that routine placement of NGTs is unnecessary.[9-15] A meta-analysis of 26 trials inclusive of 3964 patients concluded that only 5% to 7% of patients undergo-

Table I. Patient demographics

	Total population	*Female*	*Male*
Number	1067	837 (78%)	230 (22%)
Age	42.3 ± 0.3	42.2 ± 0.3	42.4 ± 0.7
Weight (lb)	334 ± 2	313 ± 2	408 ± 6
Height (in)	66.1 ± 0.1	64.9 ± 0.1	70.6 ± 0.2
BMI (Kg-m^2)	53.6 ± 0.3	52.4 ± 0.3	57.9 ± 0.8
Postoperative NGT	52	40 (77%)	12 (23%)

Data are presented as the mean ± SEM. *BMI*, Body mass index.

Table II. Contingency table analysis for postoperative nasogastric decompression and complications

	(-) NGT	*(+) NGT*	*Total/complication*
(-) Complication	959	47	1006
(+) Complication	56	5	61
Total/NGT	1015	52	

n = 1067.
P = .214.

Table III. Morbidity and mortality after RYGB in patients with and without postoperative NGTs

Morbidity and mortality	*Patients with complications without an NGT (n = 1015)*	*Patients with complications with NGT (n = 52)*
Major complications		
Death	14	0
Anastomotic leak	10	5
Sepsis	5	0
Pulmonary embolus	9	0
Evisceration	3	0
UGI bleed	7	0
Marginal ulcer	3	0
Anastomotic stricture	1	0
Bowel obstruction	10	0
Minor complications		
Respiratory/renal failure	9	0

UGI, Upper gastrointestinal.

ing abdominal operations benefited from nasogastric intubation.[3] Although there was a greater incidence of abdominal distension and vomiting with patients who did not receive routine postoperative nasogastric decompression, there were far fewer incidents of fever, atelectasis, and pneumonia.

Because patients with obesity frequently have respiratory dysfunction after surgical intervention[3,16] nasogastric intubation poses a greater risk for iatrogenic pulmonary complications in these patients than in their counterparts who are of normal weight. The current literature lacks data that specifically addresses the need for routine nasogastric intubation after bariatric operation such that the risk/benefit ratio for nasogastric intubation after RYGB remains unresolved. In this study, we reviewed our experience with patients undergoing RYGB to assess the difference in complication rate between a large group of patients without postoperative NGTs compared with a smaller group of patients who had postoperative NGT placement, to determine the need of postoperative NGT placement after this operation.

METHODS

Patients. Patients undergoing gastric bypass operation for the treatment of morbid obesity at the UCLA medical center from December 1993 to June 2000 were included in the study. A total of 1067 patients (837 female [78%], 230 male [22%]) were evaluated for the risk of developing complications with and without postoperative nasogastric decompression. The average length of stay (LOS) for each cohort was entered in our patient database. The hospital quality assurance (QA) coordinator monitored outcomes for all patients.

Operation. At the UCLA bariatric surgical program, we exclusively perform the RYGB (Fig 1) as

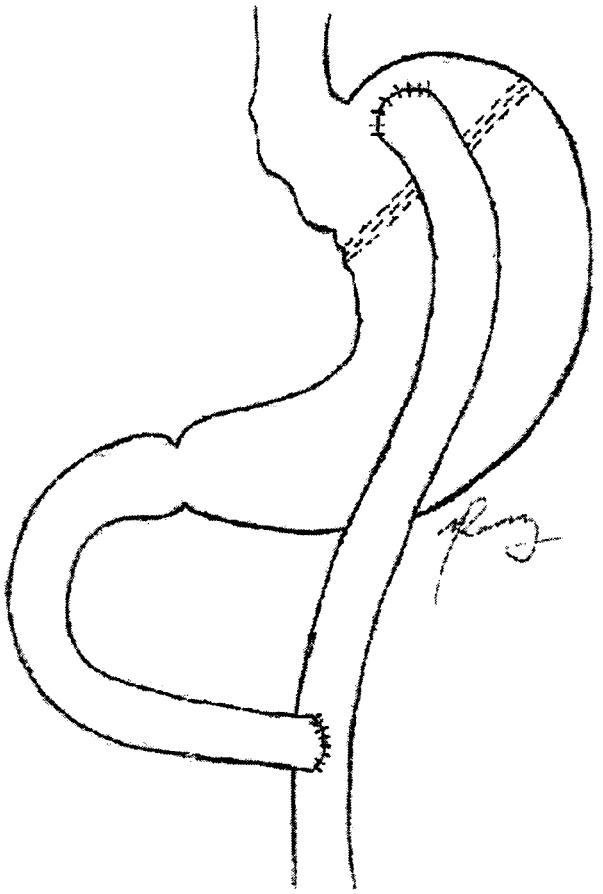

Fig 1. The RYGB consists of 2 anastomoses: A proximal gastrojejunostomy connects the gastric pouch to the jejunal limb. The Y is created by a jejunojejunostomy approximately 50 cm distal to the gastrojejunostomy.

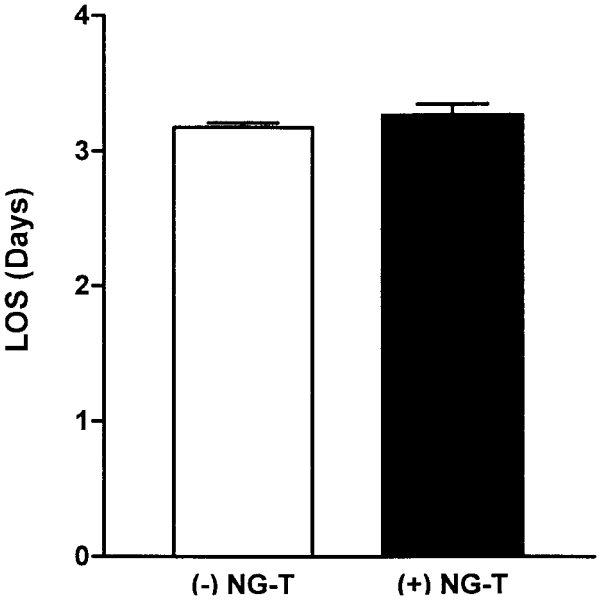

Fig 2. The average LOS was not affected in the cohort of patients with NGT decompression (*NG-T*) after RYGB (n = 52) versus patients who did not (n = 1015).

several studies have shown this operation to be superior to vertical-banded gastroplasty for the treatment of morbid obesity.[1,2] All operations were performed by 1 of 4 bariatric surgeons using a standardized technique. Briefly, the proximal 30-mL gastric pouch was created by firing a heavy-wire stapler (TLH-60, Ethicon, Somerville, NJ) horizontally across the stomach. The jejunum was divided 30 cm distal to the ligament of Treitz and the first arcade of mesenteric vessels divided with a vascular gastrointestinal anastomosis stapler. The distal cut end of the jejunum was then tunneled through the transverse mesocolon to lie anterior to the stomach. All anastomoses were hand-sewn. The gastrojejunostomy was created by sewing the limb to the pouch side-to-side with a single layer of 3-0 polyglyconate suture over a 32 F bougie catheter, creating a 1-cm anastomosis. The small bowel anastomosis was performed side-to-side in 2 layers using an inner layer of running 3-0 polyglyconate and an outer layer of interrupted 3-0 silk sutures. This jejunojejunostomy was created 40 to 50 cm distal to the gastrojejunostomy. The abdomen was closed with either interrupted #1 polyglyconate or a running #0 looped polyglyconate suture. The skin was closed with a running, continuous 4-0 Monocryl suture or skin staples.

Outcomes. A hospital-based QA coordinator collected outcome data independent of the surgical team. LOS and complication data were entered into a database. All complications such as marginal ulcers and leaks were reviewed. In addition to the QA coordinator's independent review, the attending physicians, housestaff, or both reported complications to the QA manager to ensure that all complications were captured.

Statistical analysis. Data were analyzed with a statistical program (SPSS, Inc, Chicago, Ill). Effects of postoperative nasogastric decompression and complications were analyzed by contingency table analysis. Statistical significance relating postoperative nasogastric decompression and complications were evaluated by Fisher exact test. Effects on the average LOS between groups were assessed by Student *t* test. All data are presented as the mean ± SEM. All values are considered to be statistically significant at $P \leq .05$.

RESULTS

Patient demographics. A total of 1067 patients underwent RYGB for the treatment of morbid obesity at the UCLA bariatric surgical program

between December 1993 and June 2000. The characteristics of our patient population are summarized in Table I.

Complications. There were a total of 64 major complications in 61 patients in our bariatric population. For statistical analysis, the number of patients with complications was used. A total of 52 patients had an NGT placed for decompression postoperatively. The placement of an NGT was before the implementation of a gastric bypass clinical pathway, which eliminated routine use of an NGT[17] or housestaff unaware of the common elimination of postoperative nasogastric decompression in our patient population. Five complications occurred in the cohort of patients who had an NGT postoperatively, whereas 59 occurred in the patients who did not. Contingency table analysis revealed that postoperative nasogastric decompression had no effect on the rate of complications when comparing both groups (P = .21; Table II).

Table III shows the specific complications in the patients with and without NGTs. Twenty-two patients who did not originally have an NGT postoperatively required placement of an NGT after RYGB. Table IV depicts the specific complications requiring an NGT and the number of patients with each given complication. There were no documented cases of pneumonia in our patient population.

There was no difference in the average LOS of patients with nasogastric decompression after laparotomy compared with the cohort of patients who received nasogastric decompression postoperatively (3.18 ± 0.03 vs 3.27 ± 0.07 days, respectively; P = .28) (Fig 2).

Table IV. Number of patients who required placement of an NGT after RYGB for postoperative complications and initially did not have an NGT

Number of patients	*Postoperative complication*
6	Small bowel obstruction
5	Pulmonary embolism
3	Respiratory/renal failure
3	Upper gastrointestinal bleed
2	Leak
1	Multisystem organ failure
1	Sepsis
1	Wound infection

DISCUSSION

Postoperative treatment of patients undergoing bariatric operation is complicated by their large size. Diminished respiratory volumes from obesity, coupled with an upper midline incision, increase the risk of postoperative respiratory complications. The ability for patients to cough and breathe deeply after surgical intervention is severely compromised by pain from NGTs. In addition, nasogastric intubation causes gastroesophageal reflux, increasing the risk of postoperative pneumonia.[18] Previously, we found that postoperative continuous positive airway pressure could be used safely for patients undergoing RYGB. Continuous positive airway pressure administered to patients with a history of sleep apnea improved postoperative ventilation without compromising the gastrojejunostomy.[19] In our continued efforts to maximize postoperative respiratory function in our bariatric population, we eliminated placement of NGTs postoperatively as part of a routine protocol.[17]

Because no complications could be attributed to the absence of NGTs, we found that nasogastric intubation is unnecessary after RYGB. Although our data do not establish a causal linkage, the absence of documented pneumonia in a population otherwise at high risk for its development suggests that improved respiratory function may have resulted at least in part from the elimination of routine postoperative nasogastric intubation. These results are similar to findings from other groups studying different operations.[11] In a case-control study, Argov et al[20] reported outcomes from patients undergoing cholecystectomy, truncal vagotomy, staging laparotomy, splenectomy, and gastric procedures who did not have NGTs placed after these operations. Pneumonia was more frequent for patients having NGTs compared with those without NGTs. Nasogastric intubation is commonly thought necessary for patients undergoing gastric operation to protect against gastric distension with subsequent anastomotic failure for those with gastric anastomoses. Studies including patients undergoing truncal vagotomy,[21] pylorectomy,[22,23] duodenal operation,[24] and gastric operations[25] found postoperative nasogastric intubation unnecessary.

Assessment of routine elimination of NGTs on postoperative outcomes after gastrointestinal anastomoses requires a large series of patients because of the low occurrence of anastomotic leaks. Our study is the largest reported series of patients undergoing a single type of upper gastrointestinal anastomosis, which provides a large enough series to assess whether routine elimination of NGTs is safe and effective in eliminating postoperative complications after RYGB. Our findings concur with other studies that have shown that routine postoperative nasogastric decompression is unnecessary.

In our bariatric population, which is at high risk for respiratory complications, we found no cases of

documented pneumonia. Relative to the meta-analysis of Cheatham et al,[3] our single series had approximately one-fourth as many patients undergoing a single operation. Taken together these results suggest that, except for limited circumstances, nasogastric intubation is not necessary after laparotomy inclusive of operations with a high gastrojejunostomy.

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